

Remarks:

Reconsideration of the application is requested.

Claims 1-6 and 16-25 remain in the application. Claim 18 has been amended. Claims 1-6 have been withdrawn from consideration. Claims 7-15 were previously cancelled.

In item 2 on page 2 of the above-identified Office action, claim 18 has been rejected as being indefinite under 35 U.S.C. § 112, second paragraph.

More specifically, the Examiner has stated that:

Claim 18 recited the limitation "wherein the introducing step is performed such that there is an implantation maximum for the passivating substance X in the vicinity of the interface." However, it is not clear to the Examiner how is the implantation maximum is defined for the passivating substance in the vicinity of the interface. Is that the maximum concentration? Is that the maximum depth of implantation? And so forth. As result the claim lacks clarity in its scope and meaning. Therefore, the claim is indefinite in its scope and meaning.

(Emphasis original)

The Examiner's comments have been considered and claim 18 has been amended to recite an implantation concentration maximum. Support for this change may be found on page 14, lines 7-10, of the specification of the instant application.

It is accordingly believed that claim 18 meets the requirements of 35 U.S.C. § 112, second paragraph. Should the Examiner find any further objectionable items, Counsel would appreciate a telephone call during which the matter may be resolved. The above-noted changes to claim 18 are provided solely for the purpose of satisfying formal requirements, clarification, or are made solely for cosmetic reasons to clarify the claim. The changes are neither provided for overcoming the prior art nor do they narrow the scope of the claim(s) for any reason related to the statutory requirements for a patent.

In item 4 on page 3 of the Office action, claims 16-21 and 23-25 have been rejected as being obvious over *Hsu* (US 5,468,657) in view of *Sato et al.* (US 6,121,117) under 35 U.S.C. § 103.

In item 5 on page 6 of the Office action, claim 22 has been held allowable, if rewritten or amended to include all of the limitations of the base claim and any intervening claims.

As will be explained below, it is believed that the claims were patentable over the cited art in their original form and the claims have, therefore, not been amended to overcome the references.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 16 calls for, inter alia:

fabricating a semiconductor structure having a base layer, an insulation layer, a monocrystalline silicon layer, and an interface between the insulation layer and the monocrystalline silicon layer;

**placing** a passivating substance X **into** the monocrystalline silicon layer, during or after the fabrication of the semiconductor structure; and

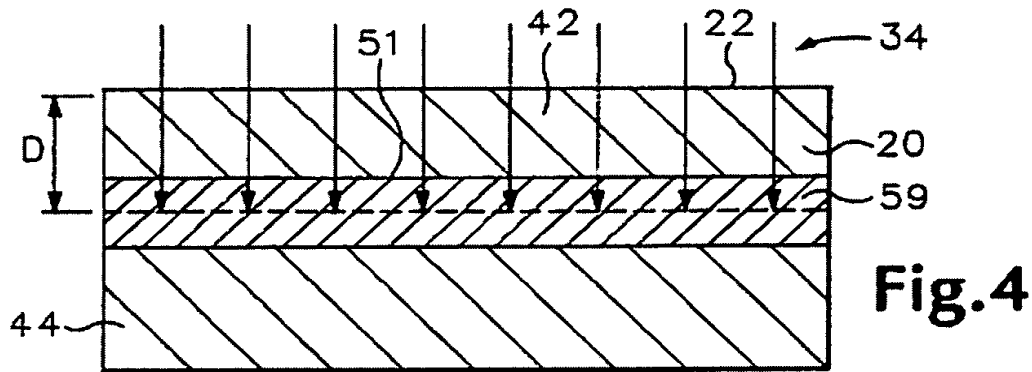
heat-treating the semiconductor structure with the passivating substance X for causing the passivating substance X in the monocrystalline silicon layer to diffuse both to the interface and to a surface of the monocrystalline silicon layer opposite to the interface.

In the *Response to Arguments* on page 7 of the Office action, the Examiner stated that:

As shown Fig. 4, as applicants correctly pointed out, Hsu et al. discloses an SOI substrate comprises the first layer (44) of monocrystalline silicon the second layer (59) of silicon oxide formed directly on the first layer and the third layer (42) of monocrystalline silicon. As figure 4 shows, the third layer (20) of the monocrystalline silicon layer is implanted with a nitrogen ion ("passivating substance") and the **nitrogen penetrates through the third layer of monocrystalline silicon (20) and goes deep into the second layer of silicon oxide (59)** (i.e., monocrystalline silicon also implanted). Therefore, Examiner respectfully submits that Hsu et al disclose introducing of "passivating substance", i.e., nitrogen ion, into a monocrystalline silicon layer.

(Emphasis added)

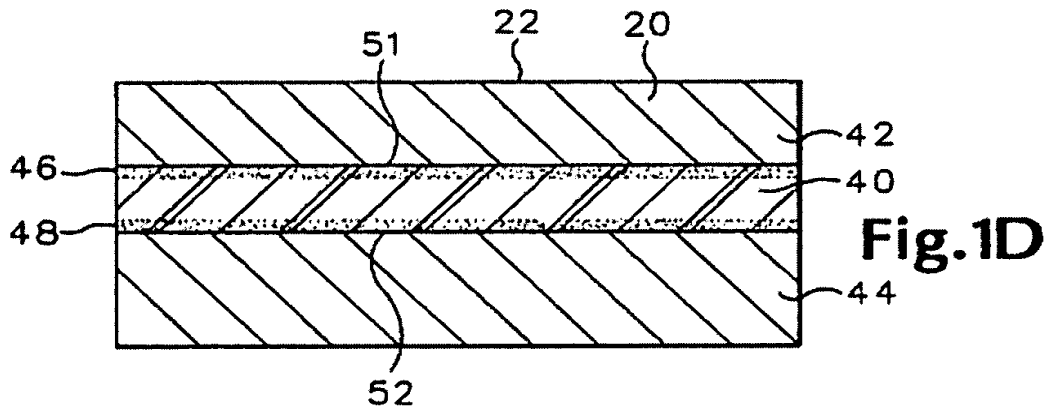
As discussed in the last response, Fig. 4 of *Hsu*, re-produced below, shows (and describes in col. 7, lines 35-38) "a wafer 20 with an upper layer 42 of monocrystalline silicon, a middle layer 59 of nitrogen-implanted silicon dioxide, and a lower monocrystalline silicon 44."



It is clear from Fig. 4 and from the specification of *Hsu* that in *Hsu* the nitrogen is placed into the **silicon dioxide layer** 59 (col. 1, lines 35-36) and **not** into the monocrystalline silicon layer 42 or monocrystalline silicon layer 44. In contrast, in the invention of the instant application as recited in claim 16, the passivating substance is placed into the **monocrystalline silicon layer**.

Furthermore, as can be clearly seen in Fig. 1D (similarly Fig. 3), re-produced below, the nitrogen diffuses within the **silicon oxide layer** 40 to the edges of the silicon oxide layer 40. In contrast, in the invention of the instant application

the passivating substance diffuses within the *monocrystalline silicon layer*.



The inventive concept of the present invention is based on the underlying realization that after introducing and placing a passivating substance X into the monocrystalline silicon layer, heat-treating the semiconductor structure, removing the screen oxide layer, and subsequent growth of a gate oxide layer on the monocrystalline silicon layer, the monocrystalline silicon layer still contains sufficient passivating substance X to increase the resistance of the gate oxide layer to damage caused by hot charge carriers. There is no disclosure or suggestion in either *Hsu* or *Sato et al.* to introduce and place a passivating substance into a monocrystalline silicon layer. Furthermore, neither *Hsu* nor *Sato et al.* contain teachings that would suggest the underlying realization on which the present invention is based. Therefore, the invention as recited in claim 16 of the

instant application is believed not to be obvious over *Hsu* in view of *Sato et al.*.


It is accordingly believed to be clear that *Hsu* in view of *Sato et al.* do not suggest the features of claim 16. Claim 16 is, therefore, believed to be patentable over the art and since claims 17-25 are ultimately dependent on claim 16, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 16-25 are solicited.

If an extension of time is required, petition for extension is herewith made.

Please charge any fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,

  
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